

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property  
Organization  
International Bureau



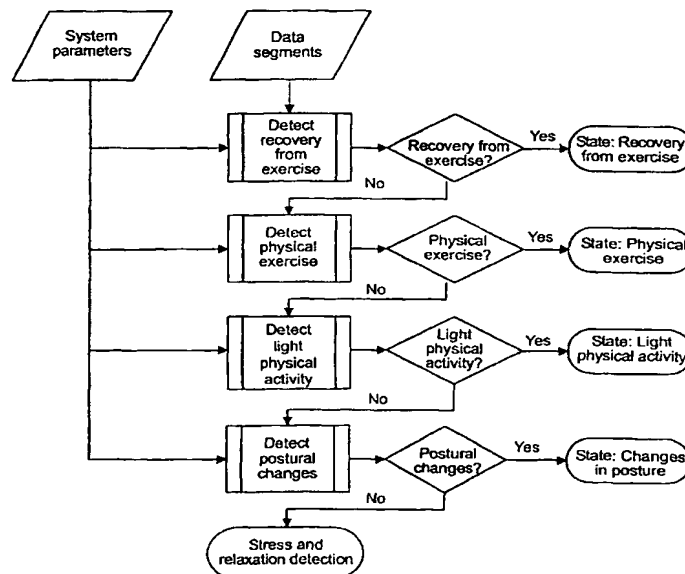
(43) International Publication Date  
26 February 2004 (26.02.2004)

PCT

(10) International Publication Number  
**WO 2004/016172 A1**

- (51) International Patent Classification<sup>7</sup>: **A61B 5/16**, 5/02, 5/0456
- (21) International Application Number: PCT/FI2003/000608
- (22) International Filing Date: 18 August 2003 (18.08.2003)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data: 20025039 16 August 2002 (16.08.2002) FI
- (71) Applicant (for all designated States except US): **FIRST-BEAT TECHNOLOGIES OY** [FI/FI]; Rautopohjankatu 6, FIN-40700 Jyväskylä (FI).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): **KETTUNEN**, Joni [FI/FI]; Haikantie 3, FIN-40900 Säynätsalo (FI). **SAALASTI**, Sami [FI/FI]; Majajärventie 3 as 3, FIN-40600 Jyväskylä (FI).
- (74) Agent: **KESPAT OY**; P.O. Box 601, FIN-40101 Jyväskylä (FI).
- (81) Designated States (national): AE, AG, AL, AM, AT (utility model), AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ (utility model), CZ, DE (utility model), DE, DK (utility model), DK, DM, DZ, EC, EE (utility model), EE, ES, FI (utility model), FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK (utility model), SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
- Published:**  
— with international search report
- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: PROCEDURE FOR DETECTION OF STRESS BY SEGMENTATION AND ANALYSING A HEART BEAT SIGNAL



(57) Abstract: The invention relates a procedure for the detection of stress state, wherein ambulatory heart beat signal is measured. In the first phase segments are defined from heart beat signal with a chosen rule for segmentation. Then at least one segment describing a physiological state with elevated cardiac activity due to physical workload and/or increased metabolic rate is identified and excluded, if exists, and segments other than the excluded segments are detected for a potential stress state, which is identified using a predetermined rule for the heart beat signal.

WO 2004/016172 A1